0.34 p=0.03). However, a stronger and negative correlation was observed between EDV and FPV (r = -0.54, p <0.001). Similar results were found with end-systolic volume and ejection fraction. Compared to Ea, estimation of LAP with FPV yielded similar to lower pressures in HCM (FPV: 15.9±4 vs.17±4 mmHg by Ea; p=0.2) but consistently higher pressures in DCM (FPV: 21±6 vs.15±5 mmHg by Ea; p<0.01).
Conclusion: In patients with impaired relaxation, flow propagation velocity is more dependent on chamber size than tissue Doppler velocity. FPV may not reflect accurately ventricular relaxation in extremes of ventricular size and thus may result in significant differences in estimation of filling pressures in these
condit ions.

1187-61 The Relationship Between Strain Rate Values in Orthogonal Directions

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Background: Tissue deformation occurs simultaneously in 3D space during relaxation or contraction. However, current TDI based methods for strain rate (SR) imaging allow SR to be measured mainly parallel to scanlines. We evaluated the relationship of the two orthogonal SR measurements in a 2D plane to see if an estimate in one direction can predict the other SR values. **Methods:** A strip of marbled beef (2x3x9cm) was longitudinally extended at 50-100 times/sec with an amplitude of 5, 10 and 15mm to model the septum or lateral wall on a 4-chamber view. Myocardial targets were produced by embedding 4 graphite fragments in a 1cm square. Tissue Doppler echo imaging (TDI) was scanned either 0° or 90° to the myocardial surface using a GE/VingMed System FiVe. TDI and SR were sampled from 0° or 90° to the surface every 33msec to obtain average values every 100msec. Distances between targets in planes parallel and perpendicular to the extension were measured every 100msec from the B-mode 2D image and used for reference SR values. We compared both these SR values scanned from 0° and 90° to the direction of motion to test accuracy of the primary direction SR and the predictability of the orthogonal direction SR data from each scanning orientation. **Results:** There was good correlation and agreement between SR and B-mode references when scanned from both 0° and 90° to the surface and the direction of motion (r = 0.99, p<0.0001 in both directions). Also, for either direction of scanning, there was an inverse but good correlation between SR values in the parallel and those of the transverse direction, 90° (y = -0.44x - 3.4, r = -0.94, p<0.0001) verified by B-mode results. Lastly, SR in one direction correctly predicted the orthogonal SR values (y = -0.43x + 0.02, r = -0.93, p<0.0001).

1187-62 Assessment of Echocardiographic Left Ventricular Mass Using Second Harmonic Imaging

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The aim of this prospective study was to assess the validity of second harmonic imaging (SHI) to calculate echocardiographic left ventricular (LV) mass, compared with fundamental imaging (FI), considered to be the reference method.
Methods: We studied 46 consecutive patients (mean age 54 years, 39% women) with suitable M-mode LV tracing. For each patient, 3 M-mode LV tracings were recorded using FI and SHI. At the end of the study, the calculation of M-mode end-diastolic parameters (interventricular septum, posterior wall and LV diameter) was performed in SHI and FI by the mean of over three measures (both ASE and Penn conventions were used) by 2 independent blinded observers (O1 and O2). LV mass was calculated and indexed by body surface area. LV hypertrophy (LVH) was present when LV mass was higher than 106 g/m² (woman) and 111 g/m² (man).
Results: For each observer, LV mass measured with SHI was significantly higher than LV mass measured with FI (p<0.008 and p<0.004 with Penn and ASE, respectively) (Table). Seven patients (15.2%) were classified as LVH using SHI, while LV mass was normal using FI. Interobserver reproducibility of LV mass measurement was similar with SHI (p=0.7 in Penn and ASE conventions), but not with FI (p<0.0001 in Penn and ASE conventions).
Conclusion: Our data clearly indicate that LV mass measurements should not be performed using SHI, because of overestimation of LV mass. However, the remarkably SHI reproducibility could be of interest if LV mass measurements using SHI were validated.

(g)	LVMassSHIO1	LVMassSHIO2	LVMassFIO1	LVMassFIO2
Penn	186±74	185±75	176±73	157±67
ASE	177±64	176±64	168±62	154±58

1187-63 Pulmonary Venous Atrial Systolic Flow Reversal Velocity During Ventricular Systole Predicts Left Atrial Elastance: A New Method for Assessing Left Atrial Systolic Function in an Animal Model

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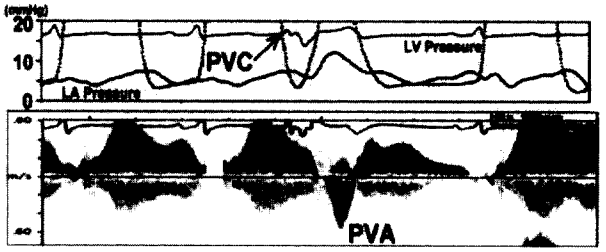
Background: Pulmonary venous atrial systolic flow reversal (PVA) has been used for evaluating left ventricular and atrial (LA) function. However, the relationship between the PVA and LA elastance has not been elucidated. We hypothesize that when atrial contraction occurs during ventricular systole (isovolumic LA contraction), PVA will be quantitatively related to LA end-systolic elastance.
Methods: Five anesthetized open chest dogs were studied. LA pressure-area loops were generated using high fidelity LA pressures and automatic border detection and quantification . The loops were obtained at baseline and during inferior caval occlusion. A linear regression analysis was applied to nonisochronal pressure-area points at left atrial end-systole, and the slope of the linear fit was defined as LA elastance (Ees). Periodic premature ventricular stimuli (PVC) were introduced to achieve isovolumic LA contraction, and the PVAs during these beats were measured using Doppler echocardiography. All variables were acquired at baseline and during the intravenous administration of dobutamine.
Results: Peak PVA velocity during PVC was significantly larger than during ordinary atrial systole at both baseline and during dobutamine administration (p<0.01, respectively, Figure). There was a significant positive correlation between Ees and peak PVA velocity during systole (p<0.05).
Conclusion: Isovolumic atrial contraction produces a large PVA, and the peak PVA velocity may be used to predict LA elastance.



1187-64 Changes of Mitral Regurgitation Severity Under Altered Loading Conditions and Its Relationship to Pulmonary Venous Flow

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Pulmonary venous flow (PVF) patterns, including normal, blunted and reversed systolic flow, are useful indexes to assess the severity of mitral regurgitation (MR). However, the specific variables of PVF that are most valuable in relation to MR are still to be determined. Therefore, in a chronic sheep model under varied loading conditions, the present study intended to ascertain if PVF indexes, not just PVF patterns, can be used as effective markers for assessing MR severity.
Methods: 10 MR and 12 control sheep were included. MR had been created by surgically severing two or three secondary mitral chordae tendinae under direct incision six months earlier. The difference between both stroke volumes obtained by the aortic and mitral flow probes was used to determine the reference MR stroke volume (MRV). Regurgitant orifice area (ROA) was calculated by dividing the MRV by the velocity-time integral (VTI) of the MR flow obtained from the CW Doppler. Epicardial Doppler 2DE and pressure recordings were used to obtain PVF systolic (Sv) and diastolic (Dv) velocities, velocity time integrals (Svti and Dvti), their ratios (Sv/Dv and Svti/Dvti) and mean left atrial pressures (mLAP). Linear regression analysis was used to correlate PVF variables with MRV and ROA, under four hemodynamic conditions, including baseline and blood, angiotensin II and nitroprusside infusions. **Results:** Average MRV and MOA were 10.6±4.3 ml/beat and 10.7±6.4 mm². Compared with that of baseline, MRV increased with the increased afterload (P<0.05) and decreased with the decreased preload (P<0.05), but ROA did not change significantly under the altered loading conditions. mLAP correlated closely with MRV(r=0.63) and Svti/Dvti(r=-0.73). Although Sv did not correlate with MR severity, Sv/Dv (r=-0.71 and -0.62) and Svti/Dvti (r=-0.63 and -0.59) had correlations with MRV and MOA, respectively, under different loading conditions.
Conclusions: Compared with ROA, MRV was more sensitive to the loading changes. In MR, Sv decreased and at the same time Dv increased with afterload increase. So the ratio of Sv/Dv and Svti/Dvti declined markedly paralleling the increase of mLAP and MRV, indicating that they are good non-invasive indexes of MR severity.

POSTER SESSION

1188 Experimental Observations Usage Contrast Echocardiography

Tuesday, March 19, 2002, Noon-2:00 p.m.
Georgia World Congress Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

1188-52 Effect of Intravenous Microbubbles and Transthoracic Ultrasound on Recanalization Rates, Myocardial Blood Flow, and Eventual Regional Function Following Acute Coronary Occlusion

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Background: Transthoracic low frequency ultrasound (TLFUS) and intravenous (IV) perfluorocarbon containing microbubbles(PESDA) may improve myocardial blood flow (MBF) in the risk area following acute coronary thrombotic occlusion (CTO) even without epicardial recanalization (REC). We hypothesized that this improvement in MBF would have beneficial effects on long term function after acute myocardial infarction. **Methods.** Twelve pigs had balloon injury-induced CTO of their left circumflex (LCX) arteries.